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| 7590 | | 04/07/2006 | EXAMINER | |
| Honeywell International Inc. Law Dept. AB 2 P.O. Box 2245 Morristown, NJ 07962-9806 | | | CAVALLARI, DANIEL J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2836 | |

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,044

Applicant(s)

NGUYEN, THAT

Examiner

Daniel J. Cavallari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9, 11-15 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 6, 10 and 16-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/12/03, 4/11/05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 11/12/2003 and 4/11/2005 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Objections

Claims 5 and 21 are objected for the following informalities:

In regard to Claim 5

The term "substantially equal to" in claim 5 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

It is unclear what would constitute being "substantially" equal to $\frac{1}{2}$ cycle of a phase.

In regard to Claim 21

Claim 21 recites the limitation "the control circuit" however a "control circuit" is not previously disclosed. There is insufficient antecedent basis for this limitation in the claim. The claim will be examined as best understood to mean "a control circuit".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 & 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation of "switching-on one of the phases... at an arbitrary time, if the phase of the electric load has not been triggered by a digital pulse waveform to be switched-on within a predetermined time after the switch-on command is received by the SSPC device, wherein the predetermined time is equal to at least ½ cycle of the phase of the electric load." The limitation begins with "...if the phase of the electric load has not been triggered..." however the claim fails to positively recite what happens if this condition is not meant. Further more, it is unclear what the relationship is between the steps of "switching-on one of the phases of the electric load at an arbitrary time..." and "...to be switched-on within a predetermined time after the switch-on command is received by the SSPC device..."

Claim 11 recites the limitation of "switching-off one of the phases... at an arbitrary time, if the phase of the electric load has not been triggered by a digital pulse waveform to be switched-off within a predetermined time after the switch-on command is received by the SSPC device, wherein the predetermined time is equal to at least ½ cycle of the phase of the electric load." The limitation begins with "...if the phase of the electric load has not been triggered..." however the claim fails to positively recite what

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happens if this condition is not meant. Further more, it is unclear what the relationship is between the steps of "switching-off one of the phases of the electric load at an arbitrary time..." and "...to be switched-off within a predetermined time after the switch-on command is received by the SSPC device..."

Because of the 112 problems, Claims 7 & 11 cannot be examined against prior art.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 12-15, & 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Coston (US 4,713,744).

Coston teaches:

In regard to Claims 1 & 12

- Switching at least one phase of a multi-phase (A,B,C) electrical load (52) on or off at a zero-crossing point (See Column 2, Lines 53-62).

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- A solid state power switching device (68, 76, 80, 86, 74, 98, 100, 102, 106, 108, 110, 112) (See Figure 1).

In regard to Claim 13

- A power switching controller, read on by Figures 2, 3, & 4, operably connected to the PSDs (68, 76, 80, 86, 74, 98, 100, 102, 106, 108, 110, 112) via control lines G1-G11 (See Figures 4 & 1), wherein the power switching controller is configured to convert each phase (See Figure 5a) into a triggering signal for controlling a corresponding PSD (See Figure 5b & Column 3, Lines 35-36).

In regard to Claim 14

- A voltage zero-crossing detection devices, read on by transformers (120, 122, 124) and circuitry of Figure 2 (See Figure 2 & Column 5, Lines 23-68) configured to receive a waveform corresponding to a phase of the power source (See Figure 10a) and convert it into a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the received waveform (See Figure 10b).

In regard to Claim 15

- Control devices, read on by opto-couplers, configured to receive the digital pulse waveform from and operably connected zero-crossing detection device as the triggering signal for a corresponding PSD (See Figure 4 & Column 8, Lines 20-47).

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In regard to Claim 21

- A voltage zero-crossing detection devices, read on by transformers (120, 122, 124) and circuitry of Figure 2 (See Figure 2 & Column 5, Lines 23-68) configured to receive a waveform corresponding to a phase of the power source (See Figure 10a) and convert it into a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the received waveform (See Figure 10b).
- A control circuit, read on by opto-couplers, configured to receive the digital pulse waveform from and operably connected zero-crossing detection device as the triggering signal for a corresponding PSD (See Figure 4 & Column 8, Lines 20-47).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5, 8, & 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coston and Ingji et al. (US 5,144,209).

Coston teaches generating a digital pulse for two of the three phases a waveform whose rising and falling edges occur at zero-crossing points to connect or disconnect a corresponding phase of a load (See Column 2, Lines 53-62, Figures 10a & 10b, Phases A & C) but fails to explicitly teach the limitation of producing a digital waveform for each

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voltage phase whose rising and falling edges occur at zeros-crossing points and using one of the edges to connect or disconnect a corresponding phase of a load.

Ingji et al. (hereinafter referred to as Ingji) teaches creating a digital square wave (See Figure 5) having rising and falling pulse edges which coincide with the zero-crossing points (See Column 8, Lines 14-48 & Figure 5) for each phase of a multiphase device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Ingji in which to detect the zero-crossing of each phase of the switching device into that switching system of Coston in which a digital waveform was produced for each phase of the system. The motivation would have been to provide the system the capability of switching any of the phases at a zero-crossing.

Coston further teaches:

In regard to Claims 3 & 9

- The switching step performed in response to a switch-on or switch-off command received by the SSPC read on by the signal received by the opto-switches of Figure 4 by the "switch-on" and "switch-off" signals produced by the flip-flops of figure 3 (See Column 6, Line 58 to Column 7, Line 66).

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In regard to Claims 4 & 5

- The switching step switching on each phase of the electric load within a predetermined time period after a first one of the phases of the electric load is switched on. The time being substantially equal to $\frac{1}{2}$ cycle of a phase of the electric load (See Figure 5b)

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coston and Gritter et al. (US 5,045,988).

Coston teaches a power switching controller (Figures 2, 3, & 4) comprising analog and digital circuitry but fails to teach an application specific integrated circuit incorporating the controller circuitry.

Gritter et al. teaches a power system incorporating an application specific integrated circuit for handling input and output signals (See Column 1, Lines 52-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an application specific integrated circuit into the power switching controller taught by Coston. The motivation would have been to reduce cost without compromising control efficiency and accuracy (See Gritter et al., Column 1, Lines 52-64).

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Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coston and Westfall et al. (US 4,672,301).

Coston teaches A voltage zero-crossing detection devices and a control circuit, read on by opto-couplers, configured to receive the digital pulse waveform from and operably connected zero-crossing detection device as the triggering signal for a corresponding PSD (See Figure 4 & Column 8, Lines 20-47) but fails to teach a current zero-crossing detector.

Westfall et al. teaches a AC power controller incorporating a current zero-crossing detection device (See Column 1, Line 60 to Column 2, Line 2 & Column 6, Lines 6-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the current zero-crossing device taught by Westfall et al. in place of the voltage zero-crossing device taught by Coston. The motivation would have been to provide a more versatile zero-crossing device which is compatible with both thyristor and transistor type devices allowing the circuit to be used in a wide variety of applications (See Westfall et al., Column 1, Lines 34-43).

Allowable Subject Matter

Claims 6, 10, & 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regard to Claims 6, 10, & 16

Claim 16 recites the limitation of the control device receiving and being triggered by an inverted digital pulse. Turner (US 6,181,092) teaches inverting a digital pulse however there would be no motivation to combine the switching system taught by Coston with the inverted signal of Turner.

In regard to Claim 17

Prior art fails to teach the control device receiving both a command signal and being triggered by the rising edge of the triggering signal received after the command signal has been received.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Cavallari whose telephone number is (571)272-8541. The examiner can normally be reached on Monday-Friday 8:30-5:00.

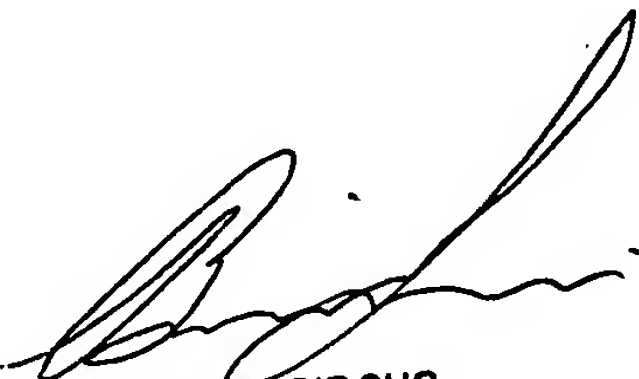
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571)272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Daniel Cavallari

March 31, 2006



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SUPERVISORY PATENT EXAMINER
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